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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,651	09/10/2003	Ofir Shalvi	TI-35196	3679
23494	7590	10/05/2006	EXAMINER FILE, ERIN M	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			ART UNIT 2611	PAPER NUMBER

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/659,651

Applicant(s)

SHALVI, OFIR

Examiner

Erin M. File

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract is less than 50 words.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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3. Claims 4 and 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "the same grid" in line 2. There is insufficient antecedent basis for this limitation in the claim.

The term "the best sequence" in line 2 of claim 6 is a relative term which renders the claim indefinite. The term "the best" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The term "better distance spectrum" in lines 4-5 of claim 7 is a relative term which renders the claim indefinite. The term "better distance spectrum" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 7 is further rendered indefinite. The term distance spectrum refers to the relationship of the distances between constellation points. The distance spectrum of a QAM signal is not of a set value, as QAM signal constellations can take rectangular, square, and circular constellation patterns, as well as irregular patterns, allowing for many different distance spectrum values. Therefore, the recitation "better distance spectrum than an uncoded QAM signal" is indefinite. Claims 8-10 are rejected as dependent upon Claim 7.

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Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Hilton et al. (U.S. Patent No. 6,185,594).

Claim 1, Hilton discloses a mapper operational to map at least one input symbol sequence into a set of multiple sequences of extended symbols (col. 7, lines 7-10); and a linear ISI filter operational to generate coded output symbols in response to the set of multiple sequences of extended symbols (col. 7, lines 7-10, an FIR filter meets the requirement of an ISI filter).

Claim 2, Hilton further discloses the linear ISI filter is selected from the group consisting of a finite impulse response (FIR) filter, and an infinite impulse response (IIR) filter (Hilton discloses an FIR filter col. 7, lines 7-10).

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under

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the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 7 is rejected under 35 U.S.C. 102(e) as being anticipated by Dagdeviren (U.S. Patent No. 7,099,403).

Claim 7, Dagdeviren discloses providing a non-linear precoder and inserting deliberate inter-symbol-interference (ISI) into an input signal via the non-linear precoder such that input data is mapped into a lattice having a better distance spectrum than an uncoded QAM signal while retaining a substantially unchanged power level from the uncoded QAM signal (col. 2, lines 25-34).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Hilton et al. (U.S. Patent No. 6,185,594) as applied to claim 1 above, and further in view of Frenger et al. (U.S. Patent No. 6,977,888).

Claim 3, although Hilton fails to disclose the linear ISI filter is configured such that its convolution with a channel impulse response yields a desired ISI generating pattern, Frenger discloses the linear ISI filter is configured such that its convolution with a channel impulse response yields a desired ISI generating

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pattern (col. 12, lines 27-28). Frenger further discloses his system has the advantages of increased throughput and decreased packet delay (abstract, lines 12-13), it would have been obvious to one skilled in the art at the time of invention to incorporate the filter as disclosed by Frenger into the invention of Hilton.

10. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilton et al. (U.S. Patent No. 6,185,594) as applied to claim 1 above, and further in view of Anderholm.

Claim 5, Hilton fails to disclose the mapper has a transform that is invertible such that no two input sequences are mapped into the same sequence of extended symbols. However, Anderholm discloses the mapper has a transform that is invertible such that no two input sequences are mapped into the same sequence of extended symbols (col. 9, lines 25-44). The use of a non-invertible mapping transformation such as this will increase system reliability by allowing symbol overwriting. Because of this advantage, it would be obvious to one skilled in the art at the time of invention to incorporate the mapping of Anderholm into the invention of Hilton.

Claim 6, Anderholm further discloses the mapper comprises a sequence selection algorithm that operates to select the best sequence from the set of multiple sequences of extended symbols (abstract, lines 26-28).

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11. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (U.S. Patent No. 7,099,403) as applied to claim 7 above, and further in view of Hilton et al. (U.S. Patent No. 6,185,594).

Claim 8, although Dagdeviren fails to disclose the non-linear precoder comprises a mapper operational to map at least one input symbol sequence into a set of multiple sequences of extended symbols; and a linear ISI filter operational to generate coded output symbols in response to the set of multiple sequences of extended symbols, Hilton discloses a mapper operational to map at least one input symbol sequence into a set of multiple sequences of extended symbols (col. 7, lines 7-10); and a linear ISI filter operational to generate coded output symbols in response to the set of multiple sequences of extended symbols (col. 7, lines 7-10, an FIR filter meets the requirement of an ISI filter). Because Hilton discloses his invention has the advantage of enabling high signal data rates (abstract, line 9), it would have been obvious to one skilled in the art at the time of invention to incorporate the symbol mapping of Hilton into the invention of Dagdeviren.

12. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren (U.S. Patent No. 7,099,403) and Hilton et al. (U.S. Patent No. 6,185,594) as applied to claim 8 above, and further in view of Frenger et al. (U.S. Patent No. 6,977,888).

Claim 9, Hilton discloses mapping at least one input symbol sequence into a set of multiple sequences of extended symbols (col. 7, lines 7-10). Although

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Dagdevrin and Hilton fails to disclose convolving a linear filter with an associated channel impulse response to yield a desired ISI generating pattern, Frenger discloses convolving a linear filter with an associated channel impulse response to yield a desired ISI generating pattern (col. 12, lines 27-28). Frenger further discloses his system has the advantages of increased throughput and decreased packet delay (abstract, lines 12-13), it would have been obvious to one skilled in the art at the time of invention to incorporate the filter as disclosed by Frenger into the invention of Hilton.

Claim 10, Hilton further discloses mapping at least one input symbol sequence into a set of multiple sequences of extended symbols comprises selecting the best sequence from the set of multiple sequences of extended symbols (col. 7, lines 7-10).

Claim Objections

13. Claim 7 is objected to because of the following informalities:

Claim 7, the acronym QAM should be properly defined as Quadrature Amplitude Modulation (QAM).

Appropriate correction is required.

Allowable Subject Matter

14. Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. File whose telephone number is (571)272-6040. The examiner can normally be reached on M-F 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Erin M. File

EMF

9/28/2006


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER